

REMARKS

Applicants acknowledge with appreciation the withdrawal of the objection to the drawings, the objection to claim 17 and the rejection of claims 17-19 and 21-30 under 35 U.S.C. § 112, second paragraph, set forth in the prior Office Action.

In the present Office Action, the rejection of claim 20 under 35 U.S.C. § 112, second paragraph, set forth in the prior Office Action is maintained on the basis that the optical index of refraction of the waveguide is allegedly not clearly disclosed in the claims or specification. Reconsideration is requested.

As generally disclosed in the first full paragraph on page 11 of the application as filed, when intermediate layer 15 has an optical index of the refraction which is less than that of the waveguide 4, excitation radiation 9 in waveguide 4 will travel therein largely loss-free.

The principle of total internal reflection under the condition that the optical index of refraction of intermediate layer 15 is less than that of waveguide 4 is well-known in the art as evidenced by section 36-5, "Total Internal Reflection" appearing in Fundamentals of Physics, copyright 1970, 1974, (pages 675-676) by John Wiley & Sons, Inc. (See attached Exhibit 1). As can be determined from the attached Exhibit 1, the actual index of refraction of intermediate layer 15 and waveguide 4 only influences the angle at which total internal reflection occurs, not the fact that internal reflection does occur. Accordingly, it is respectfully submitted that it is not necessary that the optical index of refraction of the waveguide be disclosed for claim 20 to meet the requirements of 35 U.S.C. § 112, second paragraph. Accordingly, withdrawal of this rejection is requested.

Claim 34 stands objected to for being of improper dependent form. In response to this objection, the term "silicone dioxide" has been changed to "silicon dioxide". It is believed that this amendment overcomes this objection.

Claim 35 has been amended to correct a typographical error.

Claims 17, 19, 22, 25-27 and 35 stand rejected under 35 U.S.C. § 102(b) for anticipation by U.S. Patent No. 5,439,647 to Saini; claims 18, 20, 21, 23, 24, 28 and 31-34 stand rejected under 35 U.S.C. § 103(a) for obviousness from the teachings of the Saini patent in view of U.S. Patent Application Publication No. 2002/0135780 to Budach et al.; and claims 28-30 and 36 stand rejected under 35 U.S.C. § 103(a) for obviousness from the teachings of the Saini patent in view of U.S. Patent No. 6,465,241 to Haronian et al.

Claim 17 recites a device for detection of at least one ligand contained in a sample that is to be analyzed. The device includes an optical waveguide on the surface of which several detection

fields are located in which receptors are directly or indirectly immobilized, wherein when each receptor comes into contact with a ligand, the receptor forms a specific bond with the ligand. At least one optical source of radiation is provided for injecting excitation radiation into the waveguide. The radiation is used for exciting the emission of luminescence radiation as a function of the bonding of the ligand to the receptor. The device also includes a semiconductor chip that has at least one radiation receiver received on a semiconductor substrate for each individual detection field to detect the luminescence radiation. The waveguide is monolithically integrated with the semiconductor substrate or is in the form of a waveguide layer located on the semiconductor chip. The radiation receiver associated with each detection field is integrated into the semiconductor substrate facing the detection field directly on the backside of the waveguide facing away from the detection field.

The Saini patent discloses in Fig. 1A thereof a device to detect a chemical or biochemical substance. The device includes an optical waveguide 20 and an optical source of radiation 14 emitting optical radiation into the waveguide 20. The device also includes a semiconductor with a radiation detector 18 arrayed on a semiconductor substrate 12. The waveguide is monolithically integrated with the semiconductor substrate (see Saini patent, column 2, lines 9-12). The device is based, however, on a different sensing principle compared to the subject matter of claim 17. Specifically, as shown in Fig. 1A of the Saini patent, light emitted by the optical source of radiation 14 passes through waveguide 20 between optical source of radiation 14 and radiation detector 18 and is lead parallel to the layer of the semiconductor substrate 12. The light passing through the sensing arm 24 portion of waveguide 20 is affected by sensing chemistry 30 as it interacts with a sample. The resulting light is incident on sloped reflective end face 32 which reflects light downward onto detector 18.

The Saini patent does not disclose, teach or suggest the use of several detection fields in which receptors are immobilized and at least one radiation receiver for each individual detection field to detect luminescence radiation. Rather, the radiation detector 18 in the Saini patent would only sense a sum signal from the absorption of the different receptor-ligand-complexes, making it impossible to measure the absorption quantity occurring at each receptor-ligand-complex.

Moreover, the Saini patent does not disclose, teach or suggest that the radiation detector is integrated into the semiconductor substrate facing the detection field directly on the back side of the waveguide facing away from the detection field. Rather, Figs. 1A and 2A of the Saini patent disclose that a distance is provided between the waveguide 20 and the radiation detectors 18 thereof.

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Absent disclosing, teaching or suggesting a device having all the limitations of claim 17, the Saini patent cannot anticipate or render obvious claim 17, or claims 18-36 dependent therefrom.

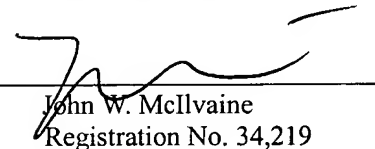
CONCLUSION

Based on the foregoing amendments and remarks, reconsideration of the objection and rejections and allowance of claims 17-36 are requested.

Respectfully submitted,

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